Improvements for Carlson Survey/Civil/Mining 2008

General Commands

- **New Toolbars** – Added 90 more default toolbar icons for common commands.
- **Reports** – Added option to output reports directly to Microsoft Word.
- **Report Formatter** – Added output option to create a table in the drawing for the selected fields. Added ability to save report with all the settings, data and user defined attributes.
- **Perpendicular From Osnap** – Added ability to snap perpendicular from linework within the 'CL transparent command.
- **Quick Keys** – Added method to call AutoCAD commands with dialog instead of command line interface.
- **Drawing Inspector** – Added option to show curve data. Added setting for high precision data display.
- ***New*** **Scale 2D** – New command to scale entities in x,y coordinates without effecting their elevation.
- **Join Nearest** – When layers or elevations don't match, add option to prompt for which one to use. Added option to stop at intersections with more that two connections.
- **Highlight Crossing Polylines** – Added tolerance settings for intersection points to merge by average.
- **3D Viewer Window** – Added options to show axis icon, bounding box and vertical scale amount. Lighting conditions automatically saved and recalled. Additional formats in bitmap output.
- **Insert Symbol** – Added option to align symbols by centerline or polyline.
- ***New*** **Draw Arc (PC,PT,Radius len)** – New command to draw an arc with these inputs.
- ***New*** **Draw Polyline Start/End** – New command draw different symbols for the start and end points of selected polylines.
- **Layer Inspector** – Added ability to select multiple layers to highlight.

Survey Commands

- **Edit-Process Raw File** – Added support for all grid projections for the Calculate Grid Scale Factor option. Added option to apply a geoid for the Calculate Grid Scale Factor option. Added function to convert point records into notes. Added function to create new raw file within editor. New processing method to calculate coordinates from angle only measurements. Added processing option to not store point numbers from the control coordinate file into the active coordinate file. Added Data On/Off records to comment out sections of the raw file from processing. Added Elevation 2D/3D notes to control whether to process elevations. Added support for angles in GONS units in spreadsheet and reports. Added report function for a summary report of the traverse, sideshot and store points in the rw5 file. Added settings for min/max ranges of valid instrument and rod heights that are checked during processing.
- **Edit-Process Level Data** – Added import of Leica level data.
- **SurvNET** – Added import of GPS vectors from LandXML and Trimble .DC formats. Added import of Leica level data. Added functions to save/load standard error settings into the project settings. Added support for more projections including UTM, New Brunswick and user-defined. Several improvements to the formatting of ALTA reports. Improved processing speed by 30%.
- **Field-to-Finish** – Added option to draw attributes as text instead of blocks with control of text style, position, prefix, suffix, layers and precision. Added option for values to assign for custom attribute symbols. Added functions to import Eagle Point and C&G code tables. Added option by code to truncate high digits of elevation labels. For JOG special code, added ability to extend a line. For curves with more than 3 points, added option to draw the best-fit curve. Added code option to align points by their associated linework.
- **Field-to-Finish Inspector** – Added ability to select multiple codes to review at a time.
- **Import Text/ASCII File** – Added option to create point group for new points.
- **Draw/Locate Points** – Improved speed of using Field-to-Finish code table and added support for more coding methods. Added option to truncate high digits from elevation labels.
- ***New*** **Coordinate System** – Added optional coordinate system data in Drawing Setup to define drawing coordinates as either grid projection or local coordinates. For local coordinates, Define Localization uses control points to define transformation between local and grid systems. The coordinate system setup is used in routines like List Points and Label Lat/Lon to label local, grid and lat/lon coordinates.
- ***New*** **Distance Scale Factor** – Added distance scale factor to Drawing Setup to report and label distances in a second system besides the drawing units such as feet-meters or ground-grid.
- **Inverse** – Added option to report in feet and inches.
- **Enter Deed Description** – Now auto-saves during command to enable resuming in case of cancel.
- **Legal Description Writer** – Added option to spell out numbers and option to report interior angles. For curves, added option to identify compound, reverse, tangential and non-tangential.

- **Trim By Point Symbols** – Improved routine to work more reliably for more types of symbols.
- **Coordinate File Utilities** – For Copy/Merge function, added prompt for range of points to use and description filter and made several improvements to the merge dialog. Added function to unlink drawing points with coordinate file. For Coordinate Transformation, added convergence angle to report.
- ***New*** **Freeze/Thaw Points** – New functions to hide/show point entities in the drawing. Points can be selected by range, group or screen selection.
- **Cut Sheet** – Added runway clearance surface method.
- **Tangent Line From Circle** – Added option to draw across circles from left to right or from right to left.
- **Building Offset Extensions** – Added option to create points at diagonals and for edges projected across building. Added controls to set layer and elevation for points.
- ***New*** **Triangle Solutions** – New triangle calculator command.
- **Draw Legend** – Added option to use description from Field-to-Finish code table as legend default.
- **Line/Curve Tables** – Added option for header line on line/curve tables.
- **Angle/Distance Annotation** – Added auto erase of old labels when relabeling the same linework.
- **Create Point Table** – Added setting for text style.
- **Bearing Leaders** – Added options to position bearing leaders above or below bearing label.
- **Draw Endpoint Leaders** – Added support for curves.

Civil Commands

- **Triangulate & Contour** – Added controls for generating smoother contours by applying an outlier reduction filter and by reducing contour vertices before Bezier smoothing. Added contour collision check to prevent crossing contours otherwise caused by smoothing adjustments. Added separate elevation range settings: one for source data and one for contour output. Added option to draw flow arrows. Added option to draw depression contours. Added function to save/load settings to style file. The Data Error Manager is changed to a dock-dialog to allow editing in the drawing while using the manager to zoom to the data problems.
- **Volume Calculations** – Improved speed of triangulation volumes by 50%.
- **Draw Triangular Mesh** – Added option to use inclusion/exclusion perimeters.
- **Draw Grid File** – Added option to reduce 3D faces resolution in areas that are fairly coplanar.
- **Offset 3D Polyline** – New method to offset polyline at slope to intersection with a surface model.
- **Create Ridge Lines From Contours** – Improved speed and added separate layer settings for ridge and summit polylines.
- ***New*** **Create Breaklines From Triangulation** – Draws 3D polylines to follow breaklines in the triangulation identified by sharp edges.
- ***New*** **Cut/Fill Contours** – New command to draw cut/fill and daylight contours between two triangulation or grid surfaces.
- ***New*** **Highlight Hard Breaklines** – New command to highlight polylines tagged as hard breaklines.
- ***New*** **Identify Strata Polylines** – New command to report whether the selected polyline is tagged as a hard breakline.
- **Make Grid File** – Added method to read source data from a coordinate file.
- **Grid File Utilities** – New macro processor to handle multiple grids in an equation, to support for grids of non-matching resolution and TIN files, and to process IF statements. Added new editor/debugger window for ease of script design. Smooth grid function added filter method to eliminate spikes. Import function added method for grids from triangulation files. Export function added method to create a triangulation file.
- **Merge Grids** – More flexible to merge grids with different positions or resolutions. For overlap regions, added options to hold first grid, replace with second grid or average the grids. Allow resizing of first grid to cover area of second grid.
- **Triangulation File Utilities** - Added function to apply subdivisonal surfaces to the triangulation.
- **Design Pad Template** – Added method to define slope as projected in slope direction instead of perpendicular to pad polyline. Added setting to control side line interval at corners.
- **Edit Pad Template** – Added method to set elevation for a single pad perimeter point. Added option to save a triangulation file for the pad surface.
- **Design Bench Pond** – Add option to merge pond surface into target surface. Add control for side line spacing and added option to round pond corners.
- ***New*** **Edit Bench Pond** – New command to edit bench pond parameters and update pond entities, surfaces and volumes.
- ***New*** **Label Polyline High/Low Points** – New command to label the elevation for high and low points of 3D polylines.
- **Label Pad Elevations** - Added link to update labels if pad elevation changes.

- ***New*** **Adjust Elevation Labels** – New command to add or remove a base elevation to elevation labels.
- ***New*** **Define Lot Edge Grade Rules** – New command to define min/max/normal slopes and grade distances for lot edges.
- ***New*** **Elevate Lot Edges By Grade Rules** – New command to create 3D polylines for lot edges using grading rules and reference 3D polylines.
- ***New*** **Elevate Pads By Grade Rules** – New command to set elevation of pads polylines at specified slopes from a reference 3D polyline.
- ***New*** **Edit-Assign Grade Rules** – New command to edit the reference elevation and slopes for a grading object.
- ***Hot New*** **SiteNet** – 70 new commands added to Civil as a spin-off from Takeoff. Organizes layers into Existing, Design and other target surfaces. Setup overall site boundary and separate area-of-interest reporting perimeters. Adjust surfaces by topsoil removal/replacement and subgrade zones. Calculate volumes and balance cut/fill by applying grading rules to selected grading objects. Report material quantities by layers for subgrades, lengths and counts.
- **Draw Spot Elevations** – When using surface model to set elevation, added link to update label if the surface model is changed..
- **Profile From Surface Entities** - Add support for railroad stationing.
- **Profile From Grid or Triangulation Surface** - Add support for railroad stationing.
- **Profile From 3D Points** - Add method to create sewer profiles using depth or invert elevation in point description fields.
- **Profile From Points On Centerline** – Added option to record point offsets to centerline into profile descriptions.
- **Draw Profile** – Added support for drawing a user-specified number of profiles at a time. Added draw grid option to use grid ticks and dots. Added setting to control width of profile polylines. For horizontal label box, added option for user-defined rows and option to draw above profile grid. For vertical curves, added option to auto-place labels above highest vertical curve, added option to label high/low points, added more PVI-V linework styles, added control of the curve symbols, added option whether to label the grades on the profile polyline and added prefix/suffix settings for all the curve labels. For profile grid, added setting for vertical grid adder to top and bottom. For profile crossings, added settings to control each label prefix, suffix, style, size, decimals and rotation. For plan-profile sheets, added options to draw sheet layout border in plan view, to draw a north arrow in plan view and to draw plan-view only sheets. For sewer/pipe profiles, added options to draw flow direction arrows on the pipes and to close pipe connections at the structures. For pipe crossings, added method to calculate and draw crossing on-the-fly and new method to specify swath width for drawing any parallel pipes. For drawing additional profiles onto an existing grid, added a button to pick the existing grid to get the grid dimensions. For station and elevation grid text, added settings for offset amount from grid lines. Added separate settings for road, sewer, pipe and crossing labels for label size, color, style and layer. New option to label profile name at start of profile polylines. Added Draw Grid options for grid ticks with checks and whether to label elevations on the left side only.
- ***Hot New*** **Adjust Plan/Profile Sheet** – New command move/rotate the plan view and to move the profile grid of a profile sheet.
- **Sections From Points** – Added option to record point offsets to section alignments into section descriptions.
- **Assign Pipe Data To Polylines** – Added settings for reference position and pipe name.
- **Input-Edit Profile** – For road profiles, added ability to set vertical curve to make a sag/crest at the specified through point. Added report function within editor. Added graphic display option to show slopes.
- **Sag & Crest Report** – Added option to draw symbol at sag/crest points. Added label settings for prefix/suffix, layer and text size.
- **Station Polyline/Centerline** – Labels linked to centerline to update labels if centerline is changed. Added options to label deflection angles, to label northing/easting of start, to draw symbols at curve PC/PT stations, and to label curve radius on PC lines. Added setting for text style for labels. Added functions to save/load settings by settings file.
- **Input-Edit Centerline** – Add function to reverse centerline. For assign point number, added option to include CL type in description.
- ***Hot New*** **Edit Centerline On-Screen** – New command to edit centerline data with interactive drawing updates along with drawing grips on centerline control points.
- **Centerline Report** – Added support for railroad curves.
- ***Hot New*** **Lot Network** – 25 new commands for subdividing a site into lot and ROW areas. Dynamically updates areas for any changes to boundaries. Includes ability to label linework and areas and to draw setback boundaries.
- **Lot File By Interior Point** – Added option to prompt for point of beginning and setting for clockwise or not.
- ***New*** **Draw Lot Setback** – New command to draw frontage, side and back lot setback offsets.
- ***New*** **Fit Structure** – New command to draw a building outline within a lot at setback offsets.

- ***New*** **Import Profile Text File** – New command for import of simple comma or space separated file.
- ***New*** **Regrade Fill Slope** – New command to regrade cross sections with smaller fill slopes while balancing end areas.
- **Calculate Section Volumes** – Added support for railroad stationing.
- **Calculate End Areas** – Added settings for layer names, decimal places and prefix/suffix on labels.
- **Design Road Profile** - Added graphic display option to show slopes. Added field for depth to spreadsheet.
- **Input-Edit Section File** – Added graphic display option to show slopes and descriptions of offset points.
- **Draw Section** – For section crossings, added settings to control each label prefix, suffix, style, size, decimals and rotation.
- ***New*** **Update Sections From Polylines** – New command to update section files from polylines originally created by Draw Section.
- **Input-Edit Template Series** – Added an option for detailed template data in the report function.
- **Input-Edit Super Elevation** – Updated AASHTO method to use 2004 greenbook equations. Added horizontal speed tables for lookup.
- **Process Road Design** – Added support for railroad stationing. Added option to draw 3D road breaklines on different layers.
- **Road Network** – Added output option to create points with control of types of stations to output and contents of description field. Added method for creating intersections between new and existing roads. Added ability to use template series file for road templates. Added option for curb grades radial to center of intersection. Added function to set cul-de-sac offset for full left or right. Added option to process road design without applying cut/fill slopes. Added option to draw 3D road breaklines on different layers. Also added options to draw 3D faces on different layers and to color in red/blue shades by cut/fill depth. Added option to set default names for existing profile and section output files. Added ability to reset project folders. Added option to output 3D polylines for subgrade breaklines. Added option to output all road network design data and final sections to single data file for stakeout in SurvCE. Added options to elevate pad and lot edges by using a specified road template ID as the elevation reference and applying grading rules.
- **Road Design Inspector** - Added ability to pick on profile graphic to set station to inspect.
- **Locate Template Points** – Added support for railroad stationing.
- **Surface Manager –** Added ability to add points outside current surface.

Hydrology Commands

- **Watershed Analysis** – Creates smoother watershed areas by automatically subdividing flat triangles in the surface. Added function to draw low points that are spillover points within the watershed. Added hatch method to hatch along width of watershed boundary. Added ability to filter watersheds reported based on their area and/or volume. SCS method is now supported if runoff library is set to use it.
- **Time of Concentration** – Added new method to use Kirpich equation.
- **Calculate C-factor** – Added link to select from c-factor library.
- **Edit Layout Element** – Added functions to report and draw stage-storage and stage-discharge graphs. Changed to spreadsheet interface with ability to insert and remove rows.
- ***New*** **Watershed Hydrograph Routing** – New commands to route hydrographs by manual SCS method (NRCS NEH-4), by Rational and by TR-55 method. For SCS method, new option for user-specified K value for peak attenuation.
- ***New*** **Reservoir Hydrograph Routing** – New command to route hydrographs through stage-storage-discharge structures.
- ***New*** **Channel Hydrograph Routings** – Two new commands to route hydrographs through open channels using Convex and Modified Att-Kin methods.
- ***New*** **Pipe Hydrograph Routing** – New command to route hydrographs through pipes.
- ***New*** **Add Hydrographs** – New command to merge two hydrographs into a new hydrograph.
- **Detention Pond Sizing** – Added sizing by linear storage estimate method.
- **Rectangular Pond Design** – Improved report and output command interface and added ability to run Design Bench Pond with design parameters.
- **Input-Edit Stage-Storage** – Added graph option to choose storage units and added report function.
- **Advanced Weir Design** – Added report function.
- **Orifice Design** – Added report function.
- **Rainfall Library** - Added methods to define storm event by entering IDF equation coefficients and by fixed intensity.
- ***New*** **Curve Number Library** – New command to define the lookup table of CN values.
- ***New*** **Import Network From 3D Polylines** – New command to create sewer network data from a 3D polylines.

- **Utility/Sanitary Networks** – Added network setting for Utility/Sanitary network in addition to Storm Sewer. When setup as Utility/Sanitary, the network commands work without using inlets or calculating flows.
- **Sewer Network Layout** – Added option whether to auto-connect new structures to network. Added field for pipe name. Added option to check for collisions with another network during design. Added method to design by min cover instead of normal slope. For min cover, added option to check cover between structures using the surface model. Added option to set additional flow to inlet. Added a new headwall inlet type.
- **Sewer Network Analysis** – Added option to use SCS runoff method for inlets. Added method for hydrograph analysis thru network. Added travel time and total time for each pipe to the flow analysis. Added report for depth of surcharge.
- ***New*** **Sewer Network Inspector** – New command to show sewer network layout and flow data while moving pointer over network elements.
- **Report Sewer Network** – Added custom report with ability to combine any of the sewer network parameters.
- **Spreadsheet Sewer Editor** – Added controls for which fields to edit and their order.
- **Draw Sewer Network Profile** – Added option to label flow values on the profile. Added option to use reference centerline for station. Added ability to draw additional reference profiles.
- **Draw Sewer Network Plan View** – Added option to draw as Mtext. Added option to label station-offset fields from reference CL and new option to label structure depth. Added option to label pipe length/slope values as structure center to center or actual pipe measurements. Added separate decimal place controls for pipe length and slope labels.
- ***New*** **Draw Sewer Network Data Table** – New command to create a data table of selected sewer network fields.
- **Move Sewer Label** – Added controls for leaders and arrowheads. Added function to restore to default position.
- **Collisions Conflict Check** – Added ability to check up to four networks at a time. Added option to use conflict navigator to view conflicts.

GIS Commands

- **GIS Query/Report** – Added method to query across multiple tables in a relational database.
- ***New*** **Data Capture (Add Point Data To Linework)** – New command to add point data to linework database entries.
- ***New*** **Drape Image on Surface** – New command that draws an image in 3D on a surface model.
- ***New*** **Place Camera Symbol/Image** – New command to draw a camera symbol with an attached image.
- **Label Object Data Areas** – Added support for Carlson GIS data. Added option to draw symbols.

Geology Commands

- **Drillhole Data** – Switched to using drawing dictionary instead of extended entity data to remove storage limit on each drillhole.
- **Define Strata** - Changed main dialog to use a spreadsheet for quick edits and with user-definable fields for the spreadhseet columns.
- **Assign Strata Correlation** – Changes are applied to updating the geologic column labels, hatching and colors.
- ***New*** **Change Drillhole Surface Z** – Sets the surface/collar elevation of drillholes to match a surface model.
- **Draw Outcrops** – Added option to label strata name on outcrop polylines.
- **Fence Diagram** – Added option to draw geologic columns on fence diagram. Added option to auto-scale hatch patterns and added select button to list available patterns.
- ***New*** **StrataCalc Data Sheet** – New command to view and edit processed strata data in spreadsheet with drillhole columns and strata rows. Shows source of each data point as from drillhole, pinchout, conformance or user-defined. For conformance, drilldown function shows which strata was used as the marker.
- ***New*** **Drillhole Top To Surface Model** – New command to report the elevation difference between the drillhole collar elevation and a reference surface model.
- ***New*** **Fill-in Missing Key As Zero** – New command to insert zero thickness key strata when strata missing from geologic sequence in drillhole.
- ***New*** **Highlight Strata Polylines** – New command to highlight polylines tagged as strata polylines.
- ***New*** **Report Strata Polylines** – New command to report polylines tagged as strata polylines.
- ***New*** **Offset Strata Polylines** – New command to create additional strata elevation polylines offset by strata thickness from a reference strata elevation polyline.
- ***New*** **Draw Strike-Dip Symbol** – New command to draw strike-dip symbols.
- ***New*** **Highlight Limit Polylines** – New command to highlight polylines tagged as limit polylines.
- ***New*** **Report Limit Polylines** – New command to report polylines tagged as limit polylines.
- **StrataCalc Modeling** – New pinchout options apply pinchout to zero thickness strata, to pinchout key strata only and to limit pinchout to strata elevations within the drillhole range. Improved All method of conformance to

automatically find the dominant marker strata to apply and to use proportional conformance for middle strata. Added option in Configure Mining Settings to only process strata included in strata definitions. Added a special code called BELOW to the drillhole header attributes to force specified strata to conform below the drillhole.

- **Calculate Variogram** – New command to analyze variogram parameters to fit a strata dataset from the drillholes.
- **Grid Modeling** – Added the ABOS modeling method.
- **Auto-Run Programs** – Updated user-interface to use spreadsheets for parameter input-edit instead of dialogs. Added settings for inverse distance parameters for each entry. Added ability to run GFU macro after Auto-Run Strata Grids. Auto-Run Grids has a new option to extrapolate the grids.
- **Composite Quality Analysis** – Added option to use limit lines.
- **Isatis Import/Export** - Added import of Istatis 3D grid models into Carlson block models.
- **Input-Edit Block Model** - Changed to spreadsheet editor for grids to handle 100+ grids per attribute.
- ***New*** **Block Model Statistics** – New command to report data value statistics on each grid within a block model.
- **Reserve Classification –** Modified to make calculation and pit creation options grid-specific rather than global.

Surface/Underground Mining Commands

- **Design Bench Pit** - Added ability to define up to 100 benches and created cross-section preview graphic.
- **Edit Pits** - New interface to show the pit data in a spreadsheet in tree-view or spread-view.
- **Assign Pit Directions** - Added methods to set direction by bearing or azimuth.
- **Equipment Calendar** – Added function to merge calendars. New report function per equipment for number of hours worked, off and maintenance. Change to rule based perpetual calendar. Ability to assign calendars to equipment, pit/panel and crew. Added named calendar events. Calendars are now stored within mining project database.
- ***Hot New*** **Pit Scheduler** - New command to assign equipment to pit blocks by time period. Shows both graphic cross-section of pits along with spreadsheet of quantities and qualities.
- **Reame Slope Stability** – Updated support for the current Reame 2004 version.
- **Pit/Panel Attributes –** Added ability to have multiple attribute groups and ability to specify attribute group to use. This will allow to have attributes specific to a type of mining or layout. New interface for editing attributes and attribute groups.

Insert Mining Symbols – Improved command interface and added drawing options.

- ***New*** **Edit Mining Symbols Library** – New command for user-defined mining symbols.
- **Projections and Ventilation** – Added ability to select symbols from symbol library.
- **Quantities By Average and Grid Methods** - Added new report options for surface owner, mineral owner and seam name. Added report of linear feet of advance when using sections with entry width values.
- **Mining Units –** Added ability to have either simple equipment-only units or units comprising of equipment and one or more crew, so that if one crew is busy, the next crew on the list could step in to work.
- **Equipment Utilization Report** – During timing this report contains information about shift by shift utilization of crews and equipment
- **Monthly Report** – During timing this report contains information about equipment availability, delays, days worked.
- **Drawing Events Capture** – Ability to add text markers into the drawing to be picked up and reported during timing. Can be used to schedule delays based on location of the unit in the mine.
- **Shifts** – Ability to have up to 4 shifts and also to have calendar and timing hide shifts not in use. Also make crews (if used) specific to certain shifts.
- **Mining Delays** – Ability to affect additional units during delays (for example for longwall panel move).
- **Assign Pit Attributes** – Changes to support attribute groups and options whether to create copy of attributes stored into the pit.

Natural Regrade Commands

- **Design GeoFluv Regrade** – Added visualization step to all volume reports and to saving the design surface.
- **RiverMORPH** – Added data import ability.

TakeOff Commands

- **Surface Inspector** – Added adjusted existing surface in case of subgrades for existing surface.
- **Edit Trench Network** - New spreadsheet editor for all structures.
- **Layer Inspector** – Added method to set layer target surface.

- **Draw Building Envelope Polyline** – Added option to have different offsets for different sides.
- **Hatch Area Of Interest Areas** – Added controls for which areas to draw and settings for colors.
- **Define Subgrades** – Added option to define layback slopes to tie into design surface instead of vertical.
- **Draw Cut/Fill Contours** – Added settings to draw labels.
- **Trench Network Quantities** – Added option to use structure rims as target surface.
- **Draw Trench Network Centerline** – Creates centerline connecting trench structures.

Data Conversions

- **CAICE** – Added import of Caice .ERP section earthwork data into Carlson .EW format.
- **Canada** – Added support for GSD95 geoid.
- **France RAF98 Geoid** – Added support for this geoid.
- **Geoid 03** – Added support Alaska, Hawaii and Puerto Rico.
- **LandXML** – Added support for sewer network data. Added import of parcel data and parcel groups from Civil 3D.
- **MOSS** – Improved import of Genio files to support curves and layers.
- **Northern Ireland Geoid** – Added support for this geoid.
- **Republic of Ireland Geoid** – Added support for this geoid.